

C. Claims

The following is a complete listing of the claims, and replaces all earlier versions and listings.

1-56. (Cancelled)

57. (Currently Amended) A method of manufacturing a spacer for use in an electron beam apparatus having an airtight container with electron-emitting devices contained therein and spacers provided in the airtight container, the method comprising:

preparing a spacer substrate having a portion, which is treated so that substantially no acute angle in a cross-section is provided at a corner portion between a first surface, which is flat, and a second surface, wherein the first surface faces a substrate of the container and the second surface is a side surface to the first surface when the spacer is arranged in the container; and

applying a liquid material for a film to at least a part of the corner portion of the spacer substrate from a nozzle by a bubble generated using thermal energy, or by a piezoelectric element,

wherein the spacer substrate is such that the following relationship is satisfied:

$$(t^2 + 4h^2) < s^2 < (t+2h)^2,$$

wherein t is a maximum value of a thickness of the spacer substrate when the film is formed from the liquid material, h is a height of the film, and s is an inner peripheral length of a section of the film.

58. (Previously Presented) The method according to claim 57, further comprising a moving step of changing a relative position of the nozzle and the spacer substrate.

59. (Previously Presented) The method according to claim 57, wherein the applying step includes a step of emitting a droplet of the liquid material from a single nozzle.

60. (Previously Presented) The method according to claim 57, wherein the liquid material is emitted from the nozzle by generating the bubble in the liquid material before the emission.

61. (Previously Presented) The method according to claim 57, wherein in the liquid material is emitted by a piezoelectric element.

62. (Previously Presented) The method according to claim 57, wherein the liquid material is sprayed.

63. (Previously Presented) The method according to claim 62, wherein a part of the sprayed liquid material does not reach the treated portion of the spacer substrate.

64. (Cancelled)

65. (Previously Presented) The method according to claim 57, wherein the liquid material comprises a metal element.

66. (Previously Presented) The method according to claim 57, wherein the film is an electrode.

67. (Previously Presented) The method according to claim 57, wherein the liquid material is applied from a plurality of nozzles.

68. (Previously Presented) The method according to claim 57, wherein the liquid material is applied simultaneously to the first surface and the second surface of the spacer substrate.

69. (Previously Presented) The method according to claim 57, wherein the spacer substrate is treated by rounding or tapering the corner portion between the first surface and the second surface of the spacer substrate.

70. (Cancelled)

71. (Previously Presented) The method according to claim 69, wherein the rounding of the spacer substrate is carried out such that a radius r of a curvature is 1% or more of a maximum value t of a thickness of the spacer substrate where the film is formed.

72. (Previously Presented) The method according to claim 57, wherein the spacer substrate is processed using hot-draw, which is carried out with relationship $S_2 > S_1$ being satisfied, where S_1 is a cross-section of a desired spacer substrate and S_2 is a cross-section of a spacer base material, with both ends of a spacer base material being fixed, a cross-section of the spacer base material being similar in shape to that of the spacer substrate, a part of the spacer base material in a longitudinal direction being heated to a temperature at or above a softening point while one end portion is fed in a direction of the heated portion at a velocity of V_1 and the other end portion is drawn in the same direction as that of V_1 at a velocity of V_2 , and a relationship $S_1 / S_2 = V_1 / V_2$ being satisfied, and wherein the spacer base material is cooled after the hot-drawn spacer base material is cut to have a desired length.

73. (Previously Presented) The method according to claim 57, wherein the spacer substrate is formed of glass or ceramic.

74. (Previously Presented) The method according to claim 57, wherein a high resistance film having a surface resistance of at least $10^5 \Omega/\text{square}$ is formed on the spacer having the film formed thereon.

75. (Previously Presented) The method according to claim 74, wherein the high resistance film has a surface resistance value of $10^5\text{-}10^{12} \Omega/\text{square}$.

76. (Previously Presented) The method according to claim 75, wherein the film has a surface resistance value of 1/10 or less of that of the high resistance film, and less than $10^7 \Omega/\text{square}$.

77. (Previously Presented) The method according to claim 74, wherein the liquid material is applied to a part of a treated area.

78. (Previously Presented) A method of manufacturing an electron beam apparatus having an airtight container with electron-emitting devices contained therein and the spacers provided in said airtight container, wherein the spacer is manufactured according to claim 57.

79. (Currently Amended) [[A]] The method of manufacturing a spacer for use in an electron beam apparatus having an airtight container with electron-emitting devices contained therein and spacers provided in the airtight container, the method

comprising: preparing a spacer substrate having a portion, which is treated so that substantially no acute angle in a cross-section is provided at a corner portion between a first surface, which is flat, and a second surface, wherein the first surface faces a substrate of the container and the second surface is a side surface to the first surface when the spacer is arranged in the container; and applying a according to claim 57, wherein the liquid material for a film to at least a part of the corner portion of the spacer substrate from a nozzle by a bubble generated using thermal energy, or by a piezoelectric element, is applied drop by drop.

80. (Previously Presented) The method according to claim 79, wherein the liquid material is applied from a plurality of nozzles each emitting the liquid material drop by drop.